

Release notes for ENDF/B Development photoat-081\_T1\_000  
evaluation

**ENDF**  
**B-VII**.dev

October 13, 2016

- checkr Warnings:

1. A previous error halted parsing of the current section  
*MAT=8100, MF= 1, MT=451 (1): Parsing stopped*

```
ERROR(S) FOUND IN MAT=8100, MF= 1, MT=451
SECTION CANNOT BE CHECKED FROM SEQUENCE NUMBER 167 TO 203
```

- checkr Errors:

1. A variable is outside the allowed ENDF range  
*MAT=8100, MF= 1, MT=451 (0): Variable range*

```
ERROR(S) FOUND IN MAT=8100, MF= 1, MT=451
MOD = 3 OUT OF RANGE 0 - 1 RECORD NUMBER 167
```

2. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=501 (0): Directory (b)*

```
ERROR(S) FOUND IN MAT=8100, MF=23, MT=501
SECTION 23/501 NOT IN DIRECTORY RECORD NUMBER 205
```

3. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=502 (0): Directory (b)*

```
ERROR(S) FOUND IN MAT=8100, MF=23, MT=502
SECTION 23/502 NOT IN DIRECTORY RECORD NUMBER 1289
```

4. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=504 (0): Directory (b)*

```
ERROR(S) FOUND IN MAT=8100, MF=23, MT=504
SECTION 23/504 NOT IN DIRECTORY RECORD NUMBER 1845
```

5. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=515 (0): Directory (b)*

```
ERROR(S) FOUND IN MAT=8100, MF=23, MT=515
SECTION 23/515 NOT IN DIRECTORY RECORD NUMBER 1886
```

6. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=516 (0): Directory (b)*

```
ERROR(S) FOUND IN MAT=8100, MF=23, MT=516
SECTION 23/516 NOT IN DIRECTORY RECORD NUMBER 1921
```

7. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=517 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=23, MT=517  
SECTION 23/517 NOT IN DIRECTORY RECORD NUMBER 1976

8. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=522 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=23, MT=522  
SECTION 23/522 NOT IN DIRECTORY RECORD NUMBER 2018

9. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=534 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=23, MT=534  
SECTION 23/534 NOT IN DIRECTORY RECORD NUMBER 2478

10. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=535 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=23, MT=535  
SECTION 23/535 NOT IN DIRECTORY RECORD NUMBER 2498

11. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=536 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=23, MT=536  
SECTION 23/536 NOT IN DIRECTORY RECORD NUMBER 2521

12. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=537 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=23, MT=537  
SECTION 23/537 NOT IN DIRECTORY RECORD NUMBER 2544

13. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=538 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=23, MT=538  
SECTION 23/538 NOT IN DIRECTORY RECORD NUMBER 2568

14. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=539 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=23, MT=539  
SECTION 23/539 NOT IN DIRECTORY RECORD NUMBER 2593

15. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=540 (0): Directory (b)*

- |   |               |      |
|---|---------------|------|
| ERROR(S) FOUND IN MAT=8100, MF=23, MT=540 | RECORD NUMBER | 2621 |
| SECTION 23/540 NOT IN DIRECTORY           |               |      |
16. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=541 (0): Directory (b)*
- |   |               |      |
|---|---------------|------|
| ERROR(S) FOUND IN MAT=8100, MF=23, MT=541 | RECORD NUMBER | 2649 |
| SECTION 23/541 NOT IN DIRECTORY           |               |      |
17. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=542 (0): Directory (b)*
- |   |               |      |
|---|---------------|------|
| ERROR(S) FOUND IN MAT=8100, MF=23, MT=542 | RECORD NUMBER | 2681 |
| SECTION 23/542 NOT IN DIRECTORY           |               |      |
18. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=543 (0): Directory (b)*
- |   |               |      |
|---|---------------|------|
| ERROR(S) FOUND IN MAT=8100, MF=23, MT=543 | RECORD NUMBER | 2711 |
| SECTION 23/543 NOT IN DIRECTORY           |               |      |
19. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=544 (0): Directory (b)*
- |   |               |      |
|---|---------------|------|
| ERROR(S) FOUND IN MAT=8100, MF=23, MT=544 | RECORD NUMBER | 2739 |
| SECTION 23/544 NOT IN DIRECTORY           |               |      |
20. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=545 (0): Directory (b)*
- |   |               |      |
|---|---------------|------|
| ERROR(S) FOUND IN MAT=8100, MF=23, MT=545 | RECORD NUMBER | 2771 |
| SECTION 23/545 NOT IN DIRECTORY           |               |      |
21. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=546 (0): Directory (b)*
- |   |               |      |
|---|---------------|------|
| ERROR(S) FOUND IN MAT=8100, MF=23, MT=546 | RECORD NUMBER | 2806 |
| SECTION 23/546 NOT IN DIRECTORY           |               |      |
22. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=547 (0): Directory (b)*
- |   |               |      |
|---|---------------|------|
| ERROR(S) FOUND IN MAT=8100, MF=23, MT=547 | RECORD NUMBER | 2852 |
| SECTION 23/547 NOT IN DIRECTORY           |               |      |
23. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=548 (0): Directory (b)*

- |  |   |               |      |
|--|---|---------------|------|
|  | ERROR(S) FOUND IN MAT=8100, MF=23, MT=548 |               |      |
|  | SECTION 23/548 NOT IN DIRECTORY           | RECORD NUMBER | 2896 |
24. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=549 (0): Directory (b)*
- |  |   |               |      |
|--|---|---------------|------|
|  | ERROR(S) FOUND IN MAT=8100, MF=23, MT=549 |               |      |
|  | SECTION 23/549 NOT IN DIRECTORY           | RECORD NUMBER | 2956 |
25. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=550 (0): Directory (b)*
- |  |   |               |      |
|--|---|---------------|------|
|  | ERROR(S) FOUND IN MAT=8100, MF=23, MT=550 |               |      |
|  | SECTION 23/550 NOT IN DIRECTORY           | RECORD NUMBER | 3016 |
26. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=551 (0): Directory (b)*
- |  |   |               |      |
|--|---|---------------|------|
|  | ERROR(S) FOUND IN MAT=8100, MF=23, MT=551 |               |      |
|  | SECTION 23/551 NOT IN DIRECTORY           | RECORD NUMBER | 3051 |
27. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=552 (0): Directory (b)*
- |  |   |               |      |
|--|---|---------------|------|
|  | ERROR(S) FOUND IN MAT=8100, MF=23, MT=552 |               |      |
|  | SECTION 23/552 NOT IN DIRECTORY           | RECORD NUMBER | 3095 |
28. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=553 (0): Directory (b)*
- |  |   |               |      |
|--|---|---------------|------|
|  | ERROR(S) FOUND IN MAT=8100, MF=23, MT=553 |               |      |
|  | SECTION 23/553 NOT IN DIRECTORY           | RECORD NUMBER | 3138 |
29. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=554 (0): Directory (b)*
- |  |   |               |      |
|--|---|---------------|------|
|  | ERROR(S) FOUND IN MAT=8100, MF=23, MT=554 |               |      |
|  | SECTION 23/554 NOT IN DIRECTORY           | RECORD NUMBER | 3203 |
30. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=559 (0): Directory (b)*
- |  |   |               |      |
|--|---|---------------|------|
|  | ERROR(S) FOUND IN MAT=8100, MF=23, MT=559 |               |      |
|  | SECTION 23/559 NOT IN DIRECTORY           | RECORD NUMBER | 3267 |
31. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=560 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=23, MT=560  
SECTION 23/560 NOT IN DIRECTORY RECORD NUMBER 3308

32. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=23, MT=561 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=23, MT=561  
SECTION 23/561 NOT IN DIRECTORY RECORD NUMBER 3353

33. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=27, MT=502 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=27, MT=502  
SECTION 27/502 NOT IN DIRECTORY RECORD NUMBER 3397

34. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=27, MT=504 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=27, MT=504  
SECTION 27/504 NOT IN DIRECTORY RECORD NUMBER 3448

35. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=27, MT=505 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=27, MT=505  
SECTION 27/505 NOT IN DIRECTORY RECORD NUMBER 3501

36. Missing a section in directory so your directory is messed up. This error will break everything else  
*MAT=8100, MF=27, MT=506 (0): Directory (b)*

ERROR(S) FOUND IN MAT=8100, MF=27, MT=506  
SECTION 27/506 NOT IN DIRECTORY RECORD NUMBER 3696

- **linear** Errors:

1. Negative cross section found  
*0: Neg. Sig(E)*

```
Linearize ENDF/B Cross Sections (LINEAR 2015-1)
-----
Retrieval Criteria----- MAT
Monitor Mode----- Off
Minimum Cross Section----- 1.0000E-10 (Default Option)
... [75 more lines]
```

- **fudge-4.0** Warnings:

1. generic warning message  
*reaction label 0: Tl + gamma [coherent] / Product: gamma (Error # 0): Warning*

WARNING: coherentScattering is not a valid distribution component for 2-body reaction

2. FIXME: Generic fudge unimplemented message  
*reaction label 0: Tl + gamma [coherent] / Product: gamma (Error # 2): Generic unimp (c)*

WARNING: Checking not yet implemented for pointwise type data

3. generic warning message  
*reaction label 1: Tl + gamma [incoherent] / Product: gamma (Error # 0): Warning*

WARNING: incoherentScattering is not a valid distribution component for 2-body reaction

4. FIXME: Generic fudge unimplemented message  
*reaction label 1: Tl + gamma [incoherent] / Product: gamma (Error # 2): Generic unimp (c)*

WARNING: Checking not yet implemented for piecewise type data

5. Cross sections do not correctly sum up properly according to an ENDF (or equivalent) sumrule  
*summedReaction label 28: total (Error # 0): Sumrule*

WARNING: Cross section does not match sum of linked reaction cross sections! Max diff: 100.00%

6. Cross sections do not correctly sum up properly according to an ENDF (or equivalent) sumrule  
*summedReaction label 30: photoelectric absorption (Error # 0): Sumrule*

WARNING: Cross section does not match sum of linked reaction cross sections! Max diff: 66.07%

- fudge-4.0 Errors:

1. Calculated and tabulated thresholds don't agree  
*reaction label 0: Tl + gamma [coherent] / Cross section: (Error # 0): Threshold mismatch*

WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1. eV!

2. 2-body reaction not in center-of-mass frame  
*reaction label 0: Tl + gamma [coherent] / Product: gamma (Error # 1): 2-body not in COM*

WARNING: 2-body reaction not in center-of-mass frame!

3. Calculated and tabulated thresholds don't agree  
*reaction label 1: Tl + gamma [incoherent] / Cross section: (Error # 0): Threshold mismatch*

WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1. eV!

4. 2-body reaction not in center-of-mass frame  
*reaction label 1: Tl + gamma [incoherent] / Product: gamma (Error # 1): 2-body not in COM*

WARNING: 2-body reaction not in center-of-mass frame!

5. Energy range of data set does not match cross section range  
*reaction label 1: Tl + gamma [incoherent] / Product: gamma / Distribution incoherentScattering - piecewise: (Error # 0): Domain mismatch (a)*  

WARNING: Domain doesn't match the cross section domain: (0.0 -> 1000000000.0) vs (1.0 -> 1e+11)
6. Calculated and tabulated thresholds don't agree  
*reaction label 2: e- + e+ + Tl [electron field] / Cross section: (Error # 0): Threshold mismatch*  

WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 2.044e6 eV!
7. Calculated and tabulated thresholds don't agree  
*reaction label 3: e- + e+ + Tl [nuclear field] / Cross section: (Error # 0): Threshold mismatch*  

WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1.022e6 eV!
8. Calculated and tabulated thresholds don't agree  
*reaction label 4: e- + Tl1s1/2 / Cross section: (Error # 0): Threshold mismatch*  

WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 85798. eV!
9. Calculated and tabulated thresholds don't agree  
*reaction label 5: e- + Tl2s1/2 / Cross section: (Error # 0): Threshold mismatch*  

WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 15330. eV!
10. Calculated and tabulated thresholds don't agree  
*reaction label 6: e- + Tl2p1/2 / Cross section: (Error # 0): Threshold mismatch*  

WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 14746. eV!
11. Calculated and tabulated thresholds don't agree  
*reaction label 7: e- + Tl2p3/2 / Cross section: (Error # 0): Threshold mismatch*  

WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 12660. eV!
12. Calculated and tabulated thresholds don't agree  
*reaction label 8: e- + Tl3s1/2 / Cross section: (Error # 0): Threshold mismatch*  

WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 3678.7 eV!
13. Calculated and tabulated thresholds don't agree  
*reaction label 9: e- + Tl3p1/2 / Cross section: (Error # 0): Threshold mismatch*  

WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 3409.7 eV!
14. Calculated and tabulated thresholds don't agree  
*reaction label 10: e- + Tl3p3/2 / Cross section: (Error # 0): Threshold mismatch*  

WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 2944.6 eV!
15. Calculated and tabulated thresholds don't agree  
*reaction label 11: e- + Tl3d3/2 / Cross section: (Error # 0): Threshold mismatch*



- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 2493.7 eV!
16. Calculated and tabulated thresholds don't agree  
*reaction label 12:  $e^- + Tl3d5/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 2393.9 eV!
17. Calculated and tabulated thresholds don't agree  
*reaction label 13:  $e^- + Tl4s1/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 831.4299999999999 eV!
18. Calculated and tabulated thresholds don't agree  
*reaction label 14:  $e^- + Tl4p1/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 713.97 eV!
19. Calculated and tabulated thresholds don't agree  
*reaction label 15:  $e^- + Tl4p3/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 600.3200000000001 eV!
20. Calculated and tabulated thresholds don't agree  
*reaction label 16:  $e^- + Tl4d3/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 406.35 eV!
21. Calculated and tabulated thresholds don't agree  
*reaction label 17:  $e^- + Tl4d5/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 385.13 eV!
22. Calculated and tabulated thresholds don't agree  
*reaction label 18:  $e^- + Tl4f5/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 132.95 eV!
23. Calculated and tabulated thresholds don't agree  
*reaction label 19:  $e^- + Tl4f7/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 128.16 eV!
24. Calculated and tabulated thresholds don't agree  
*reaction label 20:  $e^- + Tl5s1/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 139.16 eV!
25. Calculated and tabulated thresholds don't agree  
*reaction label 21:  $e^- + Tl5p1/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 99.03 eV!
26. Calculated and tabulated thresholds don't agree  
*reaction label 22:  $e^- + Tl5p3/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 77.95999999999999 eV!

27. Calculated and tabulated thresholds don't agree  
*reaction label 23:  $e^- + Tl5d3/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 22.4 eV!
28. Calculated and tabulated thresholds don't agree  
*reaction label 24:  $e^- + Tl5d5/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 20.01 eV!
29. Calculated and tabulated thresholds don't agree  
*reaction label 25:  $e^- + Tl6s1/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 12.36 eV!
30. Calculated and tabulated thresholds don't agree  
*reaction label 26:  $e^- + Tl6p1/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 5.46 eV!
31. Calculated and tabulated thresholds don't agree  
*reaction label 27:  $e^- + Tl6p3/2$  / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 4.3 eV!
32. Calculated and tabulated thresholds don't agree  
*summedReaction label 28: total / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1. eV!
33. Calculated and tabulated thresholds don't agree  
*summedReaction label 29: pair product / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1.022e6 eV!
34. Calculated and tabulated thresholds don't agree  
*summedReaction label 30: photoelectric absorption / Cross section: (Error # 0): Threshold mismatch*
- WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 4.3 eV!

- **xsectplotter** Warnings:

1. Encountered runtime warning in xsectplotter or Fudge or matplotlib  
*Error: RuntimeWarning*

```
stderr while processing crossSection
```

```
/usr/local/lib/python2.7/site-packages/matplotlib-1.3.1-py2.7-linux-x86_64.egg/matplotlib/pyplot.py:412: RuntimeWarning:
... [3 more lines]
```